



Natural Heritage & Endangered Species Program

Massachusetts Division of Fisheries & Wildlife
Route 135, Westborough, MA 01581

Telephone: (508) 389-6360/Fax: (508) 389-7891
www.nhesp.org

Stygian Shadowdragon Dragonfly *Neurocordulia yamaskanensis*

State Status: **Special Concern**
Federal Status: None

DESCRIPTION: The Stygian Shadowdragon (*Neurocordulia yamaskanensis*) is a large insect of the order Odonata and suborder Anisoptera (the dragonflies). The Shadowdragons belong to a family of dragonflies known as the emeralds (Corduliidae). Most emeralds are characterized by moderate pubescence (hairiness) on the thorax, brilliant green eyes in mature individuals, and metallic green highlights on the face, thorax and abdomen. Shadowdragons (genus *Neurocordulia*) are one of the exceptions, being somber in coloration, with browns and dull yellows, and without metallic highlights or green eyes. The Stygian Shadowdragon is a typical member of the genus with an overall chocolate brown coloration. The face is largely olive/brown and the large eyes, which meet at the top of the head, are brown to chestnut.

The thorax is a deep olive brown. The tube-shaped abdomen is dark brown with dark yellow spots on each side of segments 4 through 8 (dragonflies and damselflies have 10 segments on their abdomen). With age, the abdomen becomes entirely dark. The hind wings have a brown, triangular spot at their bases, while the forewings have a small rectangular-shaped brown marking at the base of their wings. Otherwise, the wings are mostly clear to smoky brown (especially in older individuals). The Stygian Shadowdragon is a strong flier. When at rest, it hangs vertically from the branch of a tree or bush, with wings held horizontally out from the body.

Adult Stygian Shadowdragons range from about 1.8 to 2.2 inches (45 to 55 mm) in length. Although male and female Stygian Shadowdragons appear similar in their coloration, the female is more heavily built with a thicker abdomen, especially at the base.

SIMILAR SPECIES: *Neurocordulia* is one of the few genera of emeralds where all of the species lack metallic green coloration and never have green eyes. The baskettails (genus *Epitheca*), also emeralds, completely lack these metallic highlights as well, and are similar in size and shape. However, these dragonflies generally have green eyes in mature adults.

The Umber Shadowdragon (*N. obsoleta*) (the only other member of this genus to occur in Massachusetts) differs in several ways from the Stygian Shadowdragon. The Stygian Shadowdragon is larger than its cousin and lacks the spotting found in the leading edges of the wings of the Umber Shadowdragon.



The Umber Shadowdragon is darker overall, and lacks the distinct yellow markings found on the thorax of the Stygian Shadowdragon. The Umber Shadowdragon is also protected in Massachusetts and is considered a species of Special Concern.

The nymphs can be distinguished by characteristics of the lateral spines on segment 9 of the abdomen as reported in keys by Soltesz (1996) and Needham *et al.* (1999).

HABITAT: The Stygian Shadowdragon is found on lakes with rocky shores and medium to large rivers that are relatively unvegetated. In Massachusetts, it is known only from the Connecticut River.

LIFE-HISTORY/BEHAVIOR: Shadowdragons are crepuscular, a behavioral clue that can help to identify these species. Stygian Shadowdragons have been observed flying in Massachusetts from early June through July.

STYGIAN SHADOWDRAGON FLIGHT PERIOD

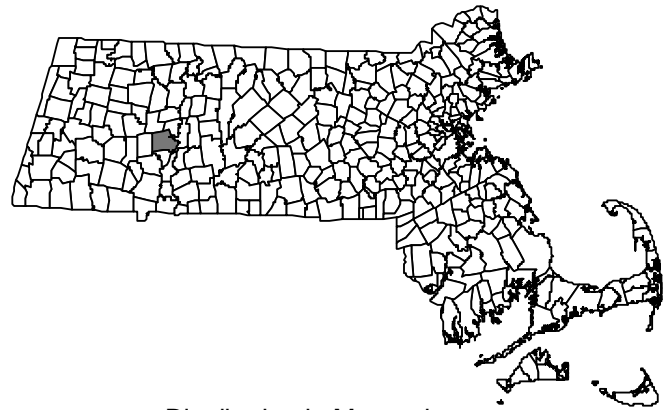
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Shadowdragons, formerly referred to as “twilight skimmers”, are unique among dragonflies for their strictly crepuscular habits. They are seen for only a short period just after sunset until dark, a window of no more than an hour. During this short time, there is a frenzy of feeding and mating as the shadowdragons try to complete the necessary life functions in an extremely abbreviated activity period. Presumably, these insects spend the rest of their time roosting in trees near their breeding habitat. Due to its unusual and elusive lifestyle, there has been little published on the life cycle of the Stygian Shadowdragon. However, the life cycles of better-known species are probably similar and can help supplement our knowledge of the Stygian Shadowdragon. Dragonflies, like their cousins the damselflies (suborder Zygoptera), have two distinct life stages: an aquatic larval stage (nymph) and a flying adult stage.

The nymphs of the Stygian Shadowdragon spend much of their time clinging to the undersides of rocks, sticks and other debris in the water waiting for an unfortunate animal to wander within reach. Dragonfly nymphs are obligate carnivores, feeding on almost any animal of appropriate size. Prey includes a variety of aquatic insects, small fish, and tadpoles. The time it takes for full development of the nymph of the Stygian Shadowdragon is not known, though for similarly sized dragonflies it usually takes about a year. The final stage of development is emergence from the aquatic larval stage to the flying adult. The nymph of the Stygian Shadowdragon crawls up onto a solid structure such as a tree, rock, bridge abutment, or bank to emerge. Soon after the adult has fully emerged from its nymphal exoskeleton (the exuviae), the insect takes its first flight. At this time, the adults are very vulnerable to predators and other threats. For this reason, the dragonfly’s maiden flight will take it away from the breeding habitat and into the woods where it can harden and mature in relative safety. This time of wandering is also spent feeding. Adult dragonflies may be found in fields and forest clearings where they prey upon small, aerial insects such as flies and mosquitoes. Although they disperse following emergence, adult shadowdragons are rarely seen away from the breeding site and it is unclear exactly where they spend this maturation period. It is presumed that much of this time is spent in the treetops. When the dragonfly is ready to breed, usually within a week or so, they return to the lake or river.

Breeding in Massachusetts probably occurs from mid-June through mid-July. At the breeding habitat, male Stygian Shadowdragons spend much of their time swiftly patrolling the edges of the lake or river searching for females with which to mate. The patrolling flight is often very near the surface of the water and can be erratic with quick changes in direction. Following mating, oviposition occurs. Females of the genus *Neurocordulia* oviposit alone and deposit their eggs directly into the water by tapping the tip of their abdomen on its surface every few feet. While ovipositing, they fly back and forth at a very rapid rate only inches above the surface of the water.

RANGE: The Stygian Shadowdragon is found throughout much of the northeastern United States. It is recorded from as far north as Maine, New York, and southern Ontario, south to Tennessee.



Distribution in Massachusetts
1977 - 2002

Based on records in Natural Heritage Database

POPULATION STATUS IN MASSACHUSETTS: The Stygian Shadowdragon is listed as a Species of Special Concern in Massachusetts. As with all species listed in Massachusetts, individuals of the species are protected from take (picking, collecting, killing, etc...) and sale under the Massachusetts Endangered Species Act. The species is known from the Connecticut River. However, due to its elusive nature and crepuscular habits, it is possible that populations of this dragonfly have been overlooked.

MANAGEMENT RECOMMENDATIONS: As for many rare species, the exact management needs of Stygian Shadowdragons are not known. With most odonates water quality is critical to their well-being, and Stygian Shadowdragons are undoubtedly no exception. Potential threats to the water quality of the Connecticut River include industrial and agricultural pollution, sewage overflow, salt and other road contaminant run-off, and siltation from construction or erosion. The impact of the disruption of natural flooding regimes by damming and water diversion projects on Stygian Shadowdragons and other riverine species is unknown but may be considerable. Extensive use of the river by power boats and jet skis is a serious concern, particularly during the early summer emergence period of Stygian Shadowdragons (as well as several clubtail species). Many riverine odonates eclose near the waterline where they are imperiled by the wakes of high speed watercraft and fluctuating water levels. The upland borders of these river systems are also crucial to the well-being of odonate populations as they are critical for feeding, resting, and maturation, particularly for the teneral adults. Development of these areas should be discouraged, and the preservation of remaining undeveloped upland should be a top priority.

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